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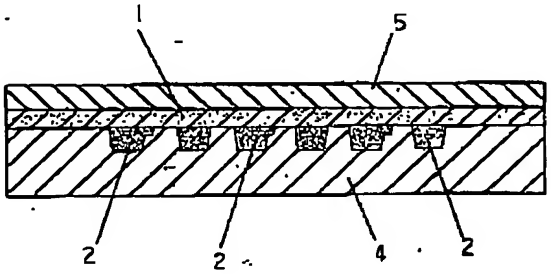
(54)【発明の名称】　靴底の製造法

(57)【要約】

【目的】軽量性に富みかつ柔軟性、屈曲性を有する靴底本体の接地面側に耐摩耗性に優れた突起を一体的に備えた靴底を提供する。

【構成】下金型の上面凹部に設けた凹嵌部内に液状ポリウレタン配合物を注流、充填し、その後該下金型の凹部内に溶解したとき透明になる性質を有するポリウレタン繊維でなるシートを収め入れ、該熱溶解シートとポリウレタン配合物とを霊金型と下金型にて挟持し、これを加熱加圧して靴底を一体成形する。



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【特許請求の範囲】

【請求項1】　溶解したとき透明になる性質を有するポリウレタン繊維でなるシート1と、上面凹部10内に靴底の滑り止め突起2に対応する複数個の凹嵌部3を設けた下金型4と、蓋金型5とを準備し、前記下金型4の各凹嵌部3内に液状ポリウレタン配合物6を注流、充填した後、前記シート1を下金型4の上面凹部8内に収め入れ、該熱溶解シート1とポリウレタン配合物を蓋金型5と下金型4とにより挟持し、これを加熱加圧した後蓋金型5を取り除くことによって透明となったシート1上にポリウレタンエラストマーの突起2を一体的に形成したことを特徴とする靴底の製造法。

【発明の詳細な説明】

【0001】

【産業上の利用分野】本発明は運動靴の製造法の改良に関するものであって、更に詳しくは軽量性に富みかつ柔軟性、屈曲性を有する靴底本体の接地面側に耐摩耗性に優れた突起を一体的に備えた靴底を提供せんとするものである。

【0002】

【従来の技術】従来滑り止め突起を有する靴底の改良として、不織布シートにポリウレタンエラストマーの突起を一体的に結合させた靴底の製造方法として、出願人の特願昭63－140729号に係る発明がある。係る方法によれば靴製造用金型である下金型内に液状ポリウレタン配合物を注流、充填した後、ポリウレタンの被膜層を有する不織布シートを載せ蓋金型にて挟持しこれを加熱加圧して所望の靴底を得るものである。しかるところこの製造法によれば、ポリウレタンの突起を不織布シートに結合する際に、その結合力を強化するために不織布シートに予めポリウレタンの被膜層を塗布する必要があった、ところがこの被膜層の塗布作業は極めて煩雑でかつ、作業の熟練度によってバラツキが生じ、部分的に不完全な接着部が生ずることもあり、品質が一定しないという欠陥があった。また従来の製造法では、前記不織布シートが加熱によって硬化しもろくなるおそれがあるため、架橋をゆるやかに促進させる方法として、一旦金型から取り出した靴底を一定時間適宜温度で熟成する工程が必要とされている。ところが、この熟成にかなり長時間費やし生産性が著しく悪く大量生産がし難いという欠陥もあった。更に不織布〔人工皮革〕は水分を吸収して膨潤し易く軽量性及び耐久性を損なうおそれがあった。従ってこのような素材の場合は殊に雨天に着用することの多いマラソン、ジョギングシューズに装着する靴底としては尚満足のいくものではなかった。

【0003】

【発明が解決しようとする課題】本発明者等は前述した従来品の欠陥に鑑み鋭意研究した結果本発明に至ったものであって、その目的とするところは、生産効率が高く、屈曲性、軽量性を有し、かつ耐摩耗性に優れ、加えて透明感を加味した斬進なデザインを有する靴底の製造法を提供せんとするものである。

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【0004】

【発明を解決するための手段】前記の課題を解決するために本発明者は次のような手段を採用するに至った。即ち本発明は、溶解したとき透明になる性質を有するポリウレタン繊維でなるシートと、上面凹部内に靴底の滑り止め突起に対応する複数個の凹嵌部を設けた下金型と、蓋金型とを準備し、前記下金型の各凹嵌部内に液状ポリウレタン配合物を注流、充填した後、前記シートを下金型の上面凹部内に収め入れ、該熱溶解シートとポリウレタン配合物を蓋金型と下金型とにより挟持し、これを加熱加圧した後蓋金型を取り除くことによって、透明となったシート上にポリウレタンエラストマーの突起を一体的に形成する製造方法を採用した。

【0005】

【作用】本発明によれば、上記のような製造方法を採用したので、靴底本体となるシートがポリウレタン繊維にて形成され、かつ熱によって溶解し、透明になる性質のものにて形成されるものであるから、靴底本体に従来品のように予めポリウレタン被膜を塗布する作業を必要とせず、液状ポリウレタン配合物を注流、充填した金型内で加熱加圧するのみで熱溶解シート上にポリウレタンエラストマーの突起を一体的に熱融合することができる。更に金型内から本靴底を取り出した後は熟成のための時間を要しないため効率的な生産を可能にすることが出来た。

【0006】

【実施例】以下本発明の靴底の製造法の一実施例を図面に従って説明すると、次のとおりである。図1はポリウレタンの繊維でなるシート1を示すものであって、加熱によって溶解したとき透明となる性質を有するものであって、該シート1は通常不透明性である。このような素材としては熱可塑性の繊維であって、ポリウレタンの長繊維を圧縮成形した不織布がもちいられる。このような素材としては、例えば株式会社トーネンタピルスのタピルス〔同社登録商標〕がある。

【0007】次に図2は上面凹部8内に靴底の突起2に対応する凹嵌部3を刻設した下金型4の断面を示している。該下金型4はシート1が載置された時、その接合面が下金型4に平坦に密接するように少なくともその上面7が同一平面状となるように形成されている。図3は下金型4を密閉する平板状の蓋金型5を示すものである。

【0008】次に本発明の製造方法を順次説明すると、先ず図4に示すように下金型4の上面8側に設けた凹嵌部3内にそれぞれ液状ポリウレタン配合物6を注流、充填する。係る液状ポリウレタン配合物6としては、イソシアネートTVポリマーに顔料を混和し、50～150度Cに加熱する一方、硬化剤、触媒を80～130度Cに加熱しておき、両者を均一に混合、攪拌した後、脱泡

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工程を経て金型へ注流、充填する。次に前記下金型4から漏れた余分の液状ポリウレタン配合物6をヘラ等を用いて除去し、下金型4の上面7と同一平面状となるようにレベリングし、次に図5及び図6に示すようにシート1を前記下金型4の上面7と接するように載置し、その上から蓋金型5にて密閉し、金型内の液状ポリウレタン配合物6が硬化するまで約100～120度の温度で、100～150気圧の圧力をかけ約30～40分間加熱加圧した後金型4．5を取り除き作業工程は完了し、図8に示すような靴底が得られた。

【0009】成形後の熱溶解シート1は加熱加圧によって溶解し透明度の高い靴底、主とし外底が得られる。シート1に結合される液状ポリウレタン配合物6は硬化してエラストマーとなし、ポリウレタンの長繊維からなるシート1に融着結合して一体的なものに成形される。

【0010】

【発明の効果】従って本発明によれば上記製造法によるものであるから、以下のような効果を発揮する。本発明によれば、上記のような製造方法を採用したので、靴底本体となる不織布シートがポリウレタン不織布にて形成され、かつ熱によって溶解し、透明になる性質のものにて形成されるものであるから、靴底本体に従来品のように予めポリウレタン被膜を塗布する工程を必要とせず、液状ポリウレタン配合物を注流、充填した金型内で加熱加圧するのみで熱溶解したシート上にポリウレタンエラストマーの突起を一体的に融着結合することができる。更に金型内から本靴底を取り出した後は長時間の熟成を要しないため効率のよい生産を可能にすることが出来た。また加熱加圧によって成形した靴底は互いに熱融合

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されるものであるから結合力が強力で突起2の剥離脱落のおそれが無く突起2の地面把持力を遺憾なく発揮することができる。加えて熱溶解シート1は成形後、加熱により透明性を帯びているため、従来にない斬新なデザインを有する靴底の提供に寄与することができた。

【図面の簡単な説明】

【図1】　シートを示す断面図。

【図2】　下金型を示す断面図。

【図3】　蓋金型を示す断面図。

【図4】　液状ポリウレタン配合物を注流した状態を示す下金型の断面図。

【図5】　金型内にシートを収め入れた製造工程を示す断面図。

【図6】　金型内にシートを収め入れた製造工程を示す断面図。

【図7】　本発明の製造工程によって得られた靴底を示す部分断面図。

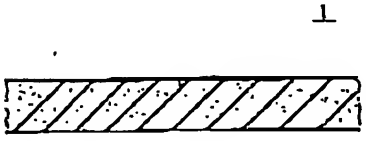
【図8】　本発明の靴底の接地面側を示す平面図。

【図9】　本発明の靴底を備えた靴の側面図。

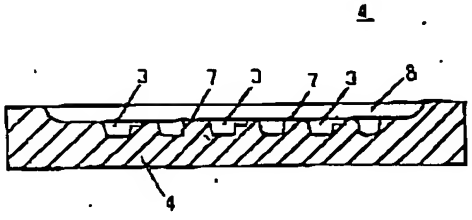
【符号の説明】

1　シート
2　突起
3　凹嵌部
4　下金型
5　蓋金型
6．液状ポリウレタン配合物
7．上面
8．凹部

【図1】

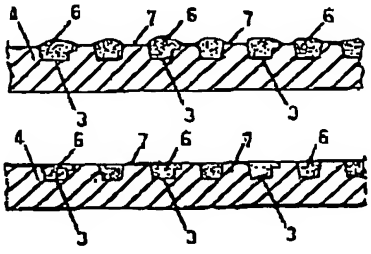


【図2】



【図3】

【図4】



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SHOE SOLE PRODUCTION METHOD

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[There are no amendments to this patent.]

Abstract

Objective

To provide a shoe sole that has extremely wear-resistant projections furnished integrally on the ground contact surface of the shoe sole main body, which is very lightweight and is also soft and flexible.

Constitution

Liquid polyurethane compound is poured into a recessed fitting part furnished in the top surface recessed part of the lower mold and it is filled. Then a sheet made of polyurethane fibers that have the property of becoming transparent when they are melted is put in the recessed part of the lower mold. Said heat-meltable sheet and the polyurethane compound are sandwiched between the cap mold and the lower mold and are thermally compressed to mold a shoe sole integrally.

//insert figure//

Claim

Shoe sole production method, characterized in that sheet (1) made of polyurethane fibers that have the property of becoming transparent when they are melted, lower mold (4), furnished with multiple recessed fitting parts (3) corresponding to slip-preventing projections (2) on the shoe sole in the top surface recessed part (10), and cap mold (5) are prepared after liquid polyurethane compound (6) is poured into each recessed fitting part (3) of aforementioned lower mold (4) such that they are filled, aforementioned sheet (1) is put into top surface recessed part (8) of lower mold (4) and the heat-meltable sheet (1) and the polyurethane compound are sandwiched by cap mold (5) and lower mold (4), and after they are thermally compressed, polyurethane elastomer projections (2) are integrally formed on sheet (1), which has become transparent, by removing cap mold (5).

Detailed explanation of the invention

[0001]

Industrial application field

This invention relates to an improvement to shoe sole production methods. More specifically, it will provide a shoe sole that is integrally furnished with projections with outstanding wear resistance on the ground contact surface of a shoe sole that is very lightweight and that is also soft and flexible.

[0002]

Prior art

Previously, production methods for shoe soles where polyurethane elastomer projections are combined integrally with a nonwoven fabric sheet include the invention by the application associated with Japanese Patent Application No. Sho 63[1988]-140729 as an improvement for shoe soles that have slip-preventing projections. With this method, a liquid polyurethane compound is poured into the die for producing the shoe sole and it is filled. Then a nonwoven fabric sheet with a polyurethane coating layer is laid on top and they are sandwiched with a cap mold and are thermally compressed to obtain the desired shoe sole. However, with this production method, when the polyurethane projections are bonded to the nonwoven fabric sheet, the nonwoven fabric sheet would have to be coated with a polyurethane coating layer in advance to strengthen the bonding force. However, the coating layer coating operation is extremely complicated, variation may occur according to the skill of the operation, and portions that are partially incompletely adhered may occur, so the disadvantage is that the quality will not be uniform. Also, with existing production methods, there is the danger that the aforementioned nonwoven fabric sheet will become brittle after curing by heating, so a process for curing the shoe sole after removal from the die for a fixed time at an appropriate temperature has been required as a method for gently promoting crosslinking. However, this curing requires a very long time and productivity is strikingly poor, with the disadvantage that mass production is difficult. In addition, the nonwoven fabric (synthetic leather) readily absorbs moisture and swells, with the danger that its light weight and durability will be lost. Thus, base materials such as this have been particularly unsatisfactory as shoe soles mounted on marathon or jogging shoes, which are often worn when it is rainy.

[0003]

Problems to be solved by the invention

The present inventors conducted serious research in consideration of the above-mentioned shortcomings of conventional products and arrived at this invention as a result. Its purpose is to

provide a shoe sole production method that has an advanced design for high production efficiency, which is flexible and lightweight, has outstanding wear resistance, and in addition, gives a sense of transparency.

[0004]

Means to solve the problems

The present inventors ended up using a means as follows to solve the aforementioned problems. In short, this invention uses a production where a sheet made of polyurethane fibers that have the property of becoming transparent when they are melted, a lower mold that is furnished with multiple recessed fitting parts corresponding to the slide-preventing projections on the shoe sole in the top surface recessed part, and a cap mold are prepared, and a liquid polyurethane compound is poured into each of the recessed fitting parts in the aforementioned lower mold such that they are filled. Then the aforementioned sheet is put into the top surface recessed part of the lower mold, the heat-meltable sheet and the polyurethane compound are sandwiched between the cap mold and the lower mold, and after they are thermally compressed, polyurethane elastomer projections are integrally formed on the sheet, which has become transparent, by removing the cap mold.

[0005]

Operation

A production method such as the one mentioned previously is used with this invention, so the sheet that will be the main body of the shoe sole is formed with polyurethane fibers, and since it is formed with a material that has the property of melting with heat and becoming transparent, the operation for coating the shoe sole main body with a polyurethane coating in advance as in the past is not required. Polyurethane elastomer projections can be heat fused integrally on the heat-meltable sheet simply by thermal compression in a die into which a liquid polyurethane compound is poured to fill it. In addition, after this shoe sole is removed from the die, no time for curing is required, so efficient production will be possible.

[0006]

Application example

Below, an application example of this invented shoe sole production method is explained according to the figures as follows. Figure 1 shows sheet (1) made of polyurethane fibers. It has the property of becoming transparent when it is heated and is melted, and said sheet (1) is normally opaque. A nonwoven fabric formed by compressing long polyurethane fibers, which are

thermoplastic fibers, is used as such a base material. An example of such a base material is Tapyrus from Tapyrus Tonen Co. Ltd. (a registered trademark of that company).

[0007]

Next, Figure 2 shows a cross section of lower mold (4) with recessed fitting parts (3), corresponding to projections (2) on the shoe sole, cut into top surface recessed part (8). Said lower mold (4) is formed so that when sheet (1) is mounted, at least its top surface (7) is formed in the same planar shape so that the top bonding surface will tightly contact lower mold (4) planarly. Figure 3 shows flat plate-shaped cap mold (5) that tightly closes lower mold (4).

[0008]

Next this invented production method will be explained in sequence. First, as shown in Figure 4, liquid polyurethane compound (6) is poured into each recessed fitting part (3) furnished on the top surface (8) of lower mold (4) and fills them. As this liquid polyurethane compound (6), while a pigment is mixed into an isocyanate TV polymer and heated to 50-150°C, the curing agent and catalyst are heated to 80-130°C. After the two are mixed uniformly and agitated, they undergo a degassing process and are poured into the die to fill it. Next, the excess liquid polyurethane compound (6) that overflows from the aforementioned lower mold (4) is removed using a spatula, etc., and it is leveled so that it will be at the same plane as top surface (7) of lower mold (4). Next, sheet (1) is mounted to touch top surface (7) of the aforementioned lower mold (4) as shown in Figures 5 and 6, it is tightly closed from the top by cap mold (5). Pressure of 100-150 atm is applied at a temperature of about 100-120° until liquid polyurethane compound (6) in the die cures, and after pressurizing under heat for about 30-40 min, dies (4) and (5) are removed and the process is completed. A shoe sole as shown in Figure 8 is obtained.

[0009]

Heat-meltable sheet (1) after molding is melted by pressurizing under heat to obtain a shoe sole, primarily an exterior sole, with high transparency. Liquid polyurethane compound (6) that is bonded to sheet (1) cures to become an elastomer and fuses to sheet (1), composed of long polyurethane fibers, so that they are integrally molded.

[0010]

Effect of the invention

Thus this invention uses the aforementioned production method, so it exhibits effects such as below. With this invention, a production method as described above is used, so a nonwoven fabric sheet, which will be the shoe sole main body, is formed with polyurethane nonwoven fabric,

and it is formed with a material that has the property of melting with heat and becoming transparent. So a process for applying a polyurethane coating beforehand to the shoe sole main body as with conventional products is not required, and polyurethane elastomer projections can be integrally fused onto the sheet, which is thermally melted simply by pressurizing under heat, in a die into which a liquid polyurethane compound is poured to fill it. In addition, after this shoe sole is removed from the die, no long curing is required, so efficient production will be possible. The shoe soles molded by pressurizing under heat are fused to each other, so the bonding force will be strong, there is no danger that projections (2) will separate or come off, and projections (2) can provide a thorough ground-gripping force. In addition, since heat-meltable sheet (1) becomes transparent with heating after molding, it can contribute to providing a shoe sole with an advanced design that did not exist heretofore.

Brief description of the figures

Figure 1 is a cross section showing the sheet.

Figure 2 is a cross section showing the lower mold.

Figure 3 is a cross section showing the cap mold.

Figure 4 is a cross section of the lower mold showing the liquid polyurethane compound poured in.

Figure 5 is a cross section showing the production process where the sheet is put into the die.

Figure 6 is a cross section showing the production process where the sheet is put into the die.

Figure 7 is a partial cross section showing a shoe sole obtained with this invented production process.

Figure 8 is a plan view showing the ground contact surface of this invented shoe sole.

Figure 9 is a side view of a shoe furnished with this invented shoe sole.

Explanation of symbols

(1) Sheet
(2) Projection
(3) Recessed fitting part
(4) Lower mold
(5) Cap mold
(6) Liquid polyurethane compound
(7) Top surface
(8) Recessed part

Figure 1

Figure 2

Figure 3

Figure 4

Figure 5

Figure 6

Figure 7

Figure 8

Figure 9